Case 3628

Terrapene putnami Hay, 1906 (Testudines, EMYDIDAE): replacement of the holotype by designation of a neotype

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Abstract. The purpose of this application, under Article 75.5 of the Code, is to conserve the current usage of the name *Terrapene putnami* Hay, 1906. We propose replacement of the nondiagnostic holotype (a fragment of a left hypoplastron) that was collected from a temporally mixed locality, with a more complete specimen comprised of the carapace, plastron, and associated non-shell postcrania from a nearby locality of late Pleistocene age. The specific name *T. putnami* is widely accepted by both palaeontologists and herpetologists as either a valid specific or subspecific name and has been established in the literature for over fifty years. However, the taxonomy of large fossil *Terrapene* specimens is ambiguous due in part to the lack of a more diagnostic and well-dated holotype for *T. putnami*. Recent molecular analyses of extant *Terrapene* species coupled with recent palaeontological studies have made the true diagnosis of the taxon imperative. It is proposed that all type species fixations for *Terrapene putnami* be set aside and a firmly dated late Pleistocene neotype be designated.

Keywords. Nomenclature; taxonomy; Reptilia; Testudines; EMYDIDAE; *Terrapene*; *Terrapene putnami*; giant box turtle; North America; Pleistocene.

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1. Hay (1906, p. 30) described the species *Terrapene putnami* based on a single hypoplastron that was dredged from the Alifia (sic) River, near Tampa, Hillsborough County, Florida. The holotype was referred to the Plio-Pleistocene (Hay, 1906, 1908) and deposited in the American Museum of Natural History, bearing the reference number AMNH 6097.

2. The species *Terrapene putnami* (or *Terrapene carolina putnami* sensu Auffenberg, 1958, p. 70), which is widely cited and established in technical literature, is currently used to represent all large fossilized *Terrapene* material recovered from the Miocene-Pleistocene of North America, and is commonly discussed in museum exhibits and popular literature.

3. The holotype of *Terrapene putnami* was recovered from the Alafia River in dredged material collected approximately one mile from the mouth at Tampa Bay by Prof. F.W. Putnam (Hay, 1906, 1908). The holotype and other fossil remains, including what Hay referred to as '*Trachemys euglypha*' (Leidy), '*Testudo*' (possibly

'*Testudo crassiscutata*' Leidy), horses and tapirs, were considered contemporaneous with the Peace Creek (now Peace River) beds of Polk County, Florida by Hay, who assigned them a Pliocene age (Hay, 1906, 1908; Auffenberg, 1958). More recent work on Peace River fossils indicates a temporal mixing of Miocene, Pleistocene, and Holocene material (Auffenberg, 1958; Hansen et al., 2001). Furthermore, materials from the Alafia River are also temporally mixed, representing all stages of the Pleistocene. Due to the mixing of different aged fossil horizons at the type locality, the current holotype of *T. putnami* is not firmly dated and has led to much confusion and ambiguity regarding the true definition of the species.

4. A number of fossil box turtle species have been described since Hay's *T. putnami* in 1906. These multiple names are probably due to (a) the fragmentary nature of the holotype of *T. putnami*; (b) confusion about the age of *T. putnami*; and (c) the large morphological variation observed in shells of *Terrapene*. *Terrapene canaliculata* Hay, 1907 (p. 850; USNM 5500) was based on fragmentary material collected from either Whitemarsh or Skedaway Island, Georgia prior to 1869 and assigned a Plio-Pleistocene age. This species was subsequently used for all large Pleistocene *Terrapene* following a reassessment by Gilmore (1927, p. 4). Due to the fragmentary nature of the material Auffenberg (1958) considered *T. canaliculata* a junior synonym of *T. putnami* (p. 70) while considering *T. putnami* a subspecies of the extant Eastern Box Turtle, *Terrapene carolina*, recombining the species as *Terrapene carolina putnami*. Not discussed by Auffenberg, but also equally important, the holotype of *T. canaliculata* is also from a temporally mixed fauna and is therefore not a suitable specimen. The holotype of *Terrapene antipex* Hay, 1916 (p. 58; USNM 8820) was described from a posterior plastral lobe recovered from the late Pleistocene (Rancholabrean NAMLA) of Vero Beach, Indian River County, Florida. It was described as being smaller than *T. putnami* and having a proportionately thinner hypoplastron (Hay, 1916; Auffenberg, 1958). As *T. antipex* was diagnosed only by being smaller than *T. putnami*, it was first synonymized with *T. canaliculata* by Gilmore (1927), which was later synonymized with *T. c. putnami* by Auffenberg (1958). The holotype of *Terrapene singletoni* Gilmore, 1927 (p. 1; USNM 11181) consists of a carapace from the Melbourne bone beds, Brevard County, Florida, which were considered to be stratigraphically equivalent to the type locality of *T. antipex* Hay (Auffenberg, 1958). Barbour & Stetson (1931, p. 37) recognized the variability within the genus *Terrapene* and synonymized *T. singletoni* along with other nominal species, *Terrapene formosa* Hay, 1916 (p. 57), *T. antipex*, and *Terrapene innoxia* Hay, 1916 (p. 61) with *T. canaliculata*. As discussed above, *T. canaliculata* was later recognized as a junior synonym of *T. c. putnami*. The holotypes of *T. formosa* and *T. innoxia* were later recognized by Auffenberg (1958, p. 78) as junior synonyms of either *Terrapene carolina carolina* or *Terrapene carolina bauri*, which is beyond the scope of this report. The holotype of *Terrapene llanensis* Oelrich, 1953 (p. 35; UMMP 26957) was described from the posterior portion of a carapace and hindlobe of a plastron along with some postcranial specimens from the last interglacial Lone Tree Arroyo locality, Meade County, Kansas. Milstead (1956, p. 163) synonymized *T. llanensis* with *T. canaliculata*, along with two late Pleistocene species described from Texas, *Terrapene bulverda* Hay, 1921 and *Terrapene impensa* Hay, 1924. Both of these latter names were based on shell fragments and are not truly diagnostic. As mentioned previously, *Terrapene canaliculata* and all its junior

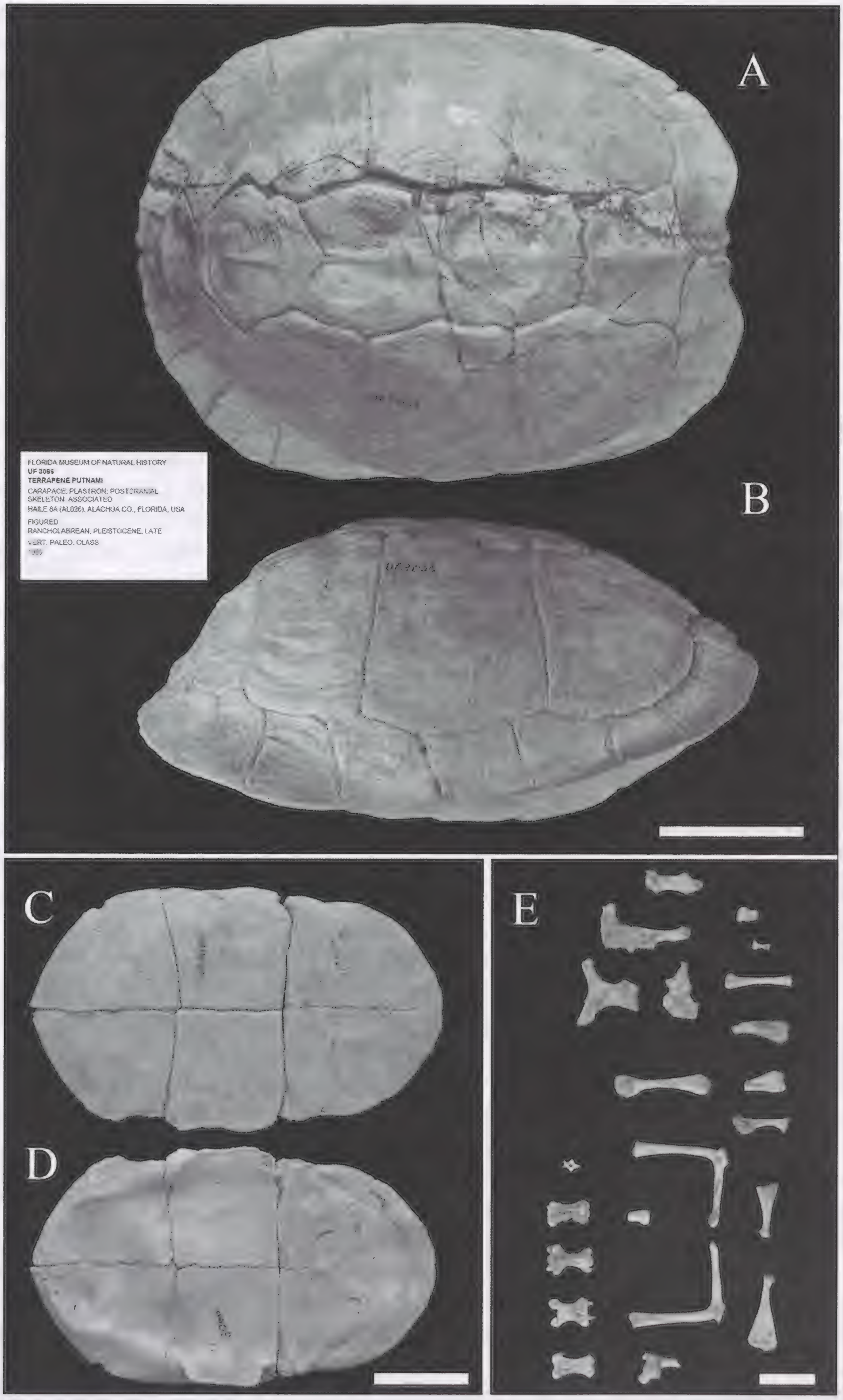

Figure 1. Proposed neotype of *Terrapene putnami* Hay, 1906, UF 3066. (A) Dorsal view of the carapace, (B) side profile of the carapace, (C) Ventral view of the plastron, (D) Dorsel view of the plastron, (E) Associated postcranial elements. (Scale bars: A, B=5 cm; C, D=5 cm; E=3 cm).

synonyms were then synonymized by Auffenberg (1958), who recognized substantial morphological variation within species of *Terrapene*. Furthermore, while Auffenberg believed the holotype of *T. c. putnami* to be late Pleistocene (Rancholabrean NALMA) in age, he referred all large fossil box turtles to *T. c. putnami* regardless of their age (Auffenberg, 1958; Milstead, 1967, 1969).

5. Recent collections made from the early Pleistocene (late Blancan to early Irvingtonian NALMAs) of Florida produced a series of nearly complete specimens of a morphologically distinct, large species of *Terrapene*. These specimens, in conjunction with previously published fossil *Terrapene* material, suggest that there was more than one taxon of large box turtle during the span of the Pleistocene (Ehret et al., 2011 and unpublished data). Despite this diversity, and due to the lack of a truly diagnostic type for *T. putnami*, some workers have attempted to synonymize the name '*putnami*' with the extant Gulf Coast Box Turtle, *Terrapene carolina major* Agassiz, 1857. This dilemma is perhaps due in part to a lack of understanding as to what '*T. putnami*' actually represents (Blaney, 1971; Bentley & Knight, 1998; Butler et al., 2011; Van Dijk et al., 2011). Butler et al. (2011) stated that *T. c. putnami* should be synonymized with *T. c. major* based on weak morphological evidence of the holotype of *T. putnami* and a preliminary genetic analysis. More recent work by Martin et al. (2013) using sequence-based molecular phylogenetics refutes this hypothesis, and retains the subspecies combination *Terrapene carolina putnami*.

6. The species *Terrapene putnami*, or the subspecies *Terrapene carolina putnami*, has been well established in the scientific literature for over half of a century (Auffenberg, 1958, 1967; Milstead 1967, 1969; Moodie & Van Devender 1977, 1979; Holman, 1966, 1975, 1985, 1987; Davis et al., 2000; Dodd, 2001; Meylan et al., 2001; Sanders, 2002; Holman & Fritz, 2005; Butler et al., 2011; Martin et al., 2013; TTWG, 2011). However, because the holotype (AMNH 6097) is fragmentary and because the true age of the holotype is not known, it is virtually non-diagnostic (other than by its large size). The resulting confusion by biologists and palaeontologists has led to disagreement towards the validity of the taxon. For these reasons we propose designating a neotype for *Terrapene putnami* that is morphologically diagnostic and well-dated to the late Pleistocene, which should be considered the true age for the holotype of *T. putnami* sensu Auffenberg (1958). As discussed previously, the available junior synonyms of *T. putnami* are not valid options for a neotype due to a combination of the poor condition fossil material, the reassignment of specimens to other taxa, and unreliably aged specimens. Because the taxonomic identity and the stratigraphic occurrence of the nominal species *Terrapene putnami* cannot be determined from its existing name-bearing type and the universality is threatened, we request the Commission to set aside under its plenary power the existing name-bearing type and designate specimen UF 3066, catalogued in the Vertebrate Paleontology collection at the Florida Museum of Natural History, as neotype.

7. Designation of UF 3066 as the neotype of *Terrapene putnami* will ensure proper and correct usage of the species name. The specimen was chosen because it is established in the literature, having been identified and figured as *Terrapene putnami* by Auffenberg (1967) and Milstead (1969; his Fig. 8E and F, caption mistakenly lists catalog number as UF 3030). The specimen consists of a nearly complete carapace, plastron, and associated postcranial elements collected from the red zone of Haile 8A, Alachua County, Florida; 27.7° N, 82.58° W (Auffenberg, 1967; Webb, 1974).

Under Article 76.3 of the Code, the neotype locality will serve as the type locality for *Terrapene putnami*. This locality is within the known range of the taxon, approximately 200 km from the current type locality, clearly delineated as early late Pleistocene, and will present researchers with a specific stratigraphic occurrence for *Terrapene putnami* under Recommendation 76A.1.4 of the Code.

8. The International Commission on Zoological Nomenclature is accordingly asked:

(1) to use its plenary power to set aside all previous type fixations for the nominal species *Terrapene putnami* Hay, 1906 and to designate specimen UF 3066 in the Florida Museum of Natural History, Gainesville, Florida as the neotype;

(2) to place on the Official List of Specific Names in Zoology, the name *putnami* Hay, 1906, as published in the binomen *Terrapene putnami* and as defined by the neotype designated in (1) above.

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